

REMARKS

The above Amendments and these Remarks are submitted under 35 U.S.C. § 132 and 37 C.F.R. § 1.111 in response to the Office Action mailed June 4, 2002 and the corrected version of the Office Action sent by the Examiner via fax on July 25, 2002. After entry of this amendment, Claims 1-17 will be pending.

Summary of the Examiner's Action and Applicants' Response

The Examiner objected to the drawings. The Examiner rejected Claim 15 under 35 U.S.C. § 112, first and second paragraph. Claims 1, 4, 5, 15, and 16 have been rejected by the Examiner under 35 U.S.C. § 102(b). The Examiner rejected Claims 2, 3, 6-8, and 10-14 under 35 U.S.C. § 103(a). In this Amendment, Claims 1-10, and 14-16 have been amended, and Claim 17 has been added. After entry of this Amendment, Claims 1-17 will be pending.

Response to Objection to the Drawings and to Rejection of Claim 15 under 35 U.S.C. § 112

The Examiner objected to the drawings under 37 C.F.R. § 1.83(a), specifically stating that the flange of first bobbin member for increasing creepage distance must be shown (as claimed in Claim 15). Claim 15 was rejected under 35 U.S.C. § 112, first paragraph, as failing to disclose an adequate written description of the first bobbin member flange for increasing creepage distance. The Examiner also rejected Claim 15 under 35 U.S.C. § 112, second paragraph, as being indefinite in lacking antecedent basis for "the creepage distance". Applicant respectfully disagrees with the drawing objection and the 35 U.S.C. § 112 rejections for Claim 15.

Applicant respectfully submits that the flange for the first bobbin member is adequately described in the specification on page 7 and shown in FIG. 1 of the drawings. More specifically, the specification on page 7, lines 17-20 states that "the first bobbin member 40 may include a **flange 43 which increases the creepage distance between the winding 51 on the first bobbin member 40, and the core 70.** In this example, the flange 43 may have a number of flange portions and these flange portions may be closely adjacent the core 70 to shield portions of the core 70 from the winding 51. Preferably, the flange 43 conforms to the outer surface of the core 70. In the example shown in FIG. 1, the flange portions are on a wall 46 of the first bobbin member 40 and are perpendicular to the wall 46." (emphasis added).

In addition, Applicant has amended Claim 15 to make the claim clearer regarding creepage distance. Therefore, Applicant respectfully requests withdrawal of the objection to the drawings and the rejections to Claim 15 under 35 U.S.C. §112.

Response to Rejection of Claims 1, 4, 5, 15, and 16 under 35 U.S.C. §102(b)

Claims 1, 4, 5, 15, and 16 have been rejected under 35 U.S.C. §102(b) as being anticipated by Cook, et al. (U.S. Patent No. 4,000,483).

Claim 1 calls for a transformer having a first bobbin member and a second bobbin member structure designed to, among other things, increase creepage distance in a way that eliminates the need for a cover, thereby reducing the size of the transformer. Claims 1, 15, and 16 have been amended to further define the structural differences of one embodiment of the present invention from the structure disclosed in Cook, et al. Specifically, Claims 1, 15, and 16 have been amended to include the following elements: the first bobbin member includes “a tubular portion extending away from the first body portion”; “the second body portion comprising two sections at the periphery of the second hollow region forming a recess separate from the second hollow region, the recess shaped such that the tubular portion is positioned therewithin for joining the first and second bobbin members”, and “wherein the first and second hollow regions are shaped to receive a core inserted therewithin”. Support for the amendment is found in the specification on page 10, lines 12-18, page 11, line 4, and on page 12, lines 5-18.

Figs. 7 and 12 show embodiments of the invention where the first bobbin member 40 has a tubular portion 49 that can be inserted within the hollow region of the second body portion 29 (shown in FIG. 6b) so that the first and the second bobbin members are coupled together without the need to use a shroud or cover (Page 10, lines 15-19). As stated in the specification, “the tubular portion 49 of the first bobbin member 40 is cooperatively structured with the recess formed by the sections 29(a), 29(b) of the second body portion 29. The tubular portion 49 may be inserted within this recess and the two bobbin members 20, 40 may be joined together. Advantageously, the two bobbin members 20, 40, may be joined together to form a transformer 100 without the need for an additional joining structure (e.g., a shroud covering both the bobbin members 20, 40).” (Page 12, lines 6-12). The tubular portion 49 increases the creepage distance between a conductive layer, positioned between the first and second bobbin members, and the core passing through the bobbin member (Page 10, lines 21-23).

By contrast, Cook, et al. teaches a transformer having a structure that requires a cover (or

shroud) having a pair of cover elements 50, 51 (Col. 3, lines 54-55 - Col. 4, line 5). Cook, et al. does not teach the structure recited in Claims 1, 15, and 16. The amendment to Claims 1, 15, and 16 emphasizes the structure for coupling the bobbin members which obviates the need for cover elements as disclosed in Cook, et al. The transformer of the present invention, as claimed in the referenced claims, is advantageous over the prior art, such as Cook, et al, since the creepage distance between the windings of a transformer according to the present invention is increased while, at the same time, providing a smaller and lower profile than known transformers (Page 10, lines 17-21). For the above reasons, Applicant respectfully submits that Cook, et al. does not anticipate Claims 1, 15, and 16.

Claim 4 and 5 have been amended to depend from Claim 2 instead of Claim 1. Therefore, Applicant respectfully submits that Claims 4 and 5 are not anticipated by Cook, et al. Claims 4 and 5 are discussed further below with respect to the rejection of Claim 2 under 35 U.S.C. §103(a).

Response to Rejection of Claims 2, 3, 6-9, and 10-14 under 35 U.S.C. §103

Claim 2 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Cook, et al. in view of Estrov (U.S. Patent No. 5,010,314). Applicant has amended Claim 2 to convert Claim 2 to an independent claim. In the Office Action, the Examiner maintains that Cook, et al. discloses the invention claimed in Claim 2 except for the two flange portions being perpendicular to each other. The Examiner further states that it would have been obvious at the time the invention was made to use the bobbin design of Estrov in Cook, et al. for the purpose of protecting the core structure. Applicant respectfully disagrees.

Cook, et al. discloses a structure such that a pair of fins 30 intersect with portions of the cover elements (webs 72, 73) at the diagonal of the bobbin, as shown in Figs. 2 and 5. Cook, et al. discloses that “advantage has been taken of the increased spacing available at the **diagonals** of the rectangular bobbins and windings by locating the **intersection** of the fins 30 and webs 72, 73 in that area.” (Col. 5, lines 50-54, emphasis added). Cook, et al. therefore teaches away from a flange having two portions substantially perpendicular to one another as claimed in Claim 2. There is no suggestion or motivation to combine the structure in Cook, et al, with the bobbin structure disclosed in Estrov. Neither Cook, et al. nor Estrov teach or suggest the transformer structure of Claim 2. Therefore, for the above reasons, Applicant respectfully submits that Claim 2 would not be obvious over Cook, et al. in view of Estrov.

Claims 4 and 5 depend from Claim 2 and are respectfully submitted as being non-obvious

for the same reasons as for Claim 2.

Claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Cook, et al. in view of Dobberstein (U.S. Patent No. 4,549,130). Claim 3 has been converted to independent form and amended to further define the structural differences of this embodiment of the present invention from the structure disclosed in Cook, et al. in view of Dobberstein. Specifically, Claim 3 now calls for a **substantially planar** conductive shield disposed between the first bobbin member and the second bobbin member. Support for this amendment is found in the specification on page 7, lines 7-12; and in Figs. 4 and 5. Neither Cook, et al. nor Dobberstein teach or suggest a substantially planar conductive shield as claimed in Claim 3. In contrast to Claim 3, Dobberstein teaches a transformer including a telescopic bobbin assembly having a shield 123 to cover the length of the bobbin sleeve 112 shown in Figs. 7 and 8. (Col. 8, lines 34-44). The shield over a sleeve taught in Dobberstein does not teach or suggest the substantially planar shield claimed in Claim 3. Therefore, Applicant respectfully submits that Claim 3 would not be obvious over Cook, et al. in view of Dobberstein.

Claims 6 and 9 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Cook, et al. in view of Eng, Jr., et al. (U.S. Patent No. 4,857,878). In the Office Action, the Examiner states that Cook, et al. discloses the invention claimed in Claim 6 except for the bobbin including pins. The Examiner further states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to include pins in the bobbin structure of Cook, et al. as suggested by Eng Jr., et al., for the purpose of providing terminals for the windings. Applicant respectfully disagrees. Claim 6 has been amended to emphasize the structural difference by specifying that the plurality of pins are connected to the corresponding winding for coupling the transformer to an external electrical circuit. Support for this amendment is found in the specification on page 5, lines 13-14. The cover elements required in the structure taught in Cook, et al. preclude modifying the structure to add the pins taught in Eng, Jr., et al. Modifying Cook, et al. to include pins on the bobbin members as in Eng, Jr., et al. would likely cause the pins to short to the cover elements and render the structure inoperative. There is no teaching, suggestion, or motivation to combine Cook, et al. and Eng, Jr., et al. as proposed by the Examiner. For the above reasons, Applicant respectfully submits that Claim 6 would not be obvious over Cook, et al. in view of Eng, Jr., et al.

Claim 9 has been amended to define the tubular portion of the transformer as having a rectangular cross-section. Fig. 9 shows an embodiment of the tubular portion having a rectangular

cross-section. By contrast, Eng., Jr. et al., as shown in Figs. 1 and 2, discloses a structure having retaining ears 204 extending from a portion 205. The retaining ears structure in Eng, Jr., et al. does not teach or suggest having a rectangular cross-section as claimed for the tubular portion in Claim 9 and shown in the embodiment in Fig. 7. Moreover, there would be no motivation to have a rectangular cross-section tubular portion in view of the shape of the core shown in Eng., Jr. et al. Therefore, Applicant respectfully submits that Claim 9 would not be obvious over Cook, et al. in view of Eng, Jr., et al.

Claims 7-8 and 10-13 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Cook, et al. in view of Equi, et al. (U.S. Patent No. 4,939,623). Applicant has amended Claims 7, 8, and 10 to more clearly emphasize the inventive structure. Support for the amendment is found in Figs. 15 -17 and in the specification on pages 13, line 8 through page 14 line 6. Claims 7, 8, and 10 call for a structure disposed on the flange such that the PCB is disposed parallel to the walls of the first bobbin member and perpendicular to the common axis. By contrast, Equi, et al. shows a PCB disposed along the common axis. (Figs. 2 and 3). Neither Cook, et al. nor Equi, et al. disclose the claimed structure such that the PCB is disposed as recited in Claims 7, 8, and 10. Therefore, for all the above reasons, Applicant respectfully submits that Claims 7, 8, and 10 are each not obvious over Cook, et al. in view of Equi, et al. Claims 11-13 depend from Claim 10 and are respectfully submitted as being non-obvious for the same reasons as for Claim 10.

Claim 14 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Cook, et al. in view of Equi, et al., and further in view of Eng, Jr., et al. Claim 14 depends on Claim 10 and is not obvious over Cook, et al. in view of Equi, et al. for the same reasons as for Claim 10 above.

Claim 14 has been amended to further define the structural difference of this embodiment of the present invention by specifying that the plurality of pins are connected to the corresponding winding for coupling the transformer to an external electrical circuit. Support for this amendment is found in the specification on page 5, lines 13-14. The cover elements required in the structure taught in Cook, et al. preclude modifying the structure to add the pins taught in Eng, Jr., et al. Modifying Cook, et al. to include pins on the bobbin members as in Eng, Jr., et al. would likely cause the pins to short to the cover elements and render the structure inoperative. There is thus no teaching, suggestion, or motivation to combine Cook, et al. and Eng, Jr., et al. Therefore, Applicant respectfully submits that Claim 14 would not be obvious over Cook, et al. in view of Eng, Jr., et al. and further in view of Eng, Jr., et al.

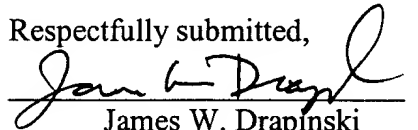
New Claim 17 has been added to further patentably define the invention. Support for Claim

17 is found throughout the specification (e.g., page 14, lines 1-6 and Figs. 16 and 17). Claim 17 calls for a transformer where each bobbin member has a slot structure for receiving a PCB. None of the references teach or suggest the structure claimed in Claim 17. Applicant therefore respectfully submits that Claim 17 is allowable.

Based on the above, Applicant respectfully submits that all pending claims, Claims 1-17, in the present application are in condition for allowance. Such allowance is respectfully solicited.

Attached hereto is a marked-up version of the changes made to the specification by this amendment. The attached pages are captioned "**Version with markings to show changes made.**"

Respectfully submitted,


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Version with markings to show changes made

In the Claims:

Claims 1-10, and 14-16 have been amended as follows:

1. (Twice amended) A transformer having at least one primary winding and one secondary winding wound about a common axis comprising:

a first bobbin member including a first body portion defining a first hollow region, [and] axially spaced walls extending radially away from the first body portion, and a tubular portion extending away from the first body portion; and

a second bobbin member including a second body portion defining a second hollow region, the second body portion comprising two sections at the periphery of the second hollow region forming a recess separate from the second hollow region, said recess shaped such that said tubular portion is positioned therewithin for joining the first and second bobbin members, axially spaced walls extending radially away from the second body portion, and a flange on one of said axially spaced walls of the second bobbin member and extending away from another of the axially spaced walls of the second bobbin member; and

wherein the first bobbin member is disposed adjacent to the second bobbin member and is partially enclosed by the flange, said primary and secondary windings respectively wound about said first and second body portions, and wherein the first and second hollow regions are shaped to receive a core inserted therewithin.

2. (amended) [The] A transformer [of claim 1] having at least one primary winding and one secondary winding wound about a common axis comprising:

a first bobbin member including a first body portion defining a first hollow region, and axially spaced walls extending radially away from the first body portion; and

a second bobbin member including a second body portion defining a second hollow region, axially spaced walls extending radially away from the second body portion, and a flange on one of said axially spaced walls of the second bobbin member and extending away from another of the axially spaced walls of the second bobbin member; and

wherein the first bobbin member is disposed adjacent to the second bobbin member and is partially enclosed by the flange, said primary and secondary windings respectively wound about

said first and second body portions, and wherein the flange includes two flange portions substantially perpendicular to each other.

3. (amended) [The] A transformer [of claim 1] having at least one primary winding and one secondary winding wound about a common axis comprising:

a first bobbin member including a first body portion defining a first hollow region, and axially spaced walls extending radially away from the first body portion;

a second bobbin member including a second body portion defining a second hollow region, axially spaced walls extending radially away from the second body portion, and a flange on one of said axially spaced walls of the second bobbin member and extending away from another of the axially spaced walls of the second bobbin member; and

a substantially planar conductive shield disposed between the first bobbin member and the second bobbin member; and

wherein the first bobbin member is disposed adjacent to the second bobbin member and is partially enclosed by the flange, said primary and secondary windings respectively wound about said first and second body portions.

4. (amended) The transformer of claim [1] 2 further comprising a ferrite core disposed within the first and second hollow regions.

5. (amended) The transformer of claim [1] 2 wherein at least one of the walls in each of the first and second bobbin members comprises a slot for receiving the wires of the primary or secondary winding.

6. (Twice amended) The transformer of claim [1] 2 wherein each of first and second bobbin members comprises a plurality of pins connected to the corresponding winding for coupling the transformer to an external electrical circuit.

7. (amended) The transformer of claim [1] 2 wherein the second bobbin member includes a structure for receiving a printed circuit board (PCB), and wherein the structure is disposed on the flange such that the PCB is disposed parallel to the walls of the first bobbin member and perpendicular to the common axis.

8. (amended) The transformer of claim [1] 2 wherein the second bobbin member includes a structure for receiving a printed circuit board (PCB), and wherein the structure is disposed on a side region of the transformer such that the PCB is disposed parallel to the walls of the first bobbin member and perpendicular to the common axis.

9. (amended) The transformer of claim 1 wherein the [first bobbin member includes a tubular portion extending away from the first body portion and is disposed to receive a core passing through the first hollow region] tubular portion has a rectangular cross-section.

10. (amended) A transformer having at least one primary winding and one secondary winding wound about a common axis comprising:

a first bobbin member including a first body portion defining a first hollow region, axially spaced walls extending radially away from the first body portion, and a structure adapted to receive a printed circuit board (PCB) so that the printed circuit board is disposed parallel to the walls of the first bobbin member and perpendicular to the common axis; and

a second bobbin member including a second body portion defining a second hollow region which is aligned with the first hollow region, and axially spaced walls extending radially away from the second body portion, and

wherein the first bobbin member is disposed adjacent to the second bobbin member, the primary and secondary windings respectively wound about said first and second body portions.

14. (amended) The transformer of claim 10 wherein the second bobbin member further comprises a plurality of pins connected to the corresponding winding for coupling the transformer to an external electrical circuit.

15. (amended) A transformer comprising:

a first bobbin member including a first body portion defining a first hollow region, axially spaced walls extending radially away from the first body portion, [and] a flange for increasing [the] creepage distance between a core disposed within the first hollow region and a coil disposed between the axially spaced walls[;], and a tubular portion extending away from the first body portion; and

a second bobbin member including a second body portion defining a second hollow region, the second body portion comprising two sections at the periphery of the second hollow region forming a recess separate from the second hollow region, said recess shaped such that the tubular portion is positioned therewithin for joining the first and second bobbin members, and axially spaced walls extending radially away from the second body portion, and
wherein the first and second hollow regions are shaped to receive a core inserted therewithin.

16. (Twice amended) A transformer assembly adapted to receive at least one primary winding and one secondary winding wound about a common axis comprising:

a first bobbin member including a first body portion defining a first hollow region, [and] axially spaced walls extending radially away from the first body portion[;], and a tubular portion extending away from the first body portion; and

a second bobbin member including a second body portion defining a second hollow region, the second body portion comprising two sections at the periphery of the second hollow region forming a recess separate from the second hollow region, said recess shaped such that the tubular portion is positioned therewithin for joining the first and second bobbin members, axially spaced walls extending radially away from the second body portion, and a flange mounted on one of said axially spaced walls of said second bobbin member and extending away from another of said axially spaced walls of said second bobbin member; and

wherein the first bobbin member is disposed adjacent to the second bobbin member and is partially enclosed by the flange, said primary and secondary windings respectively wound about said first and second body portions, and wherein the first and second hollow regions are shaped to receive a core inserted therewithin.